

ABSTRACT

[0044] A photodiode has a photodiode gate structure on the surface of the substrate. The photodiode may be located in a pixel sensor cell comprising a substrate having a first surface level. The photodiode has a first doped region of a first conductivity type and a second doped region of a second conductivity type located beneath the first surface level of the substrate. A photodiode gate is formed of a first dielectric substance layer formed over the first surface of the substrate, thereby forming a second surface, and a second polysilicon layer formed over the second surface of the first layer. A transistor is located adjacent to the photodiode. The photodiode gate improves charge transfer from the photodiode to the transfer gate and floating diffusion region. The improved charge transfer minimizes image lag and leakage and reduces energy barriers.